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(54) Electric engine control electronic board

(57) The electronic control board (8,14) as per the invention comprises an electronic reader of the turning of the engine shaft, an engine stoppage programmer at one or several points which enables engine stoppages repetitively and periodically on a programmed basis, an input code or code for start of operation and of the programming of the engine stoppages at the required points, an engine and braking load limitation function, and a component which acts as a clock, enabling the engine operation to be programmed with the stoppages at the required points with great timing precision, so that the user simply needs to send a signal to the engine (2,15) at a specified time when the engine (2,15) reaches a stoppage point required to be programmed so that it will repeat periodically every 24 hours; this signal is memorized at the specified time, and the time and stoppage point programmed can be changed, and which integrates a miniaturized power supply making it possible to integrate it in the assembly of direct-current, low-voltage tubular engines.

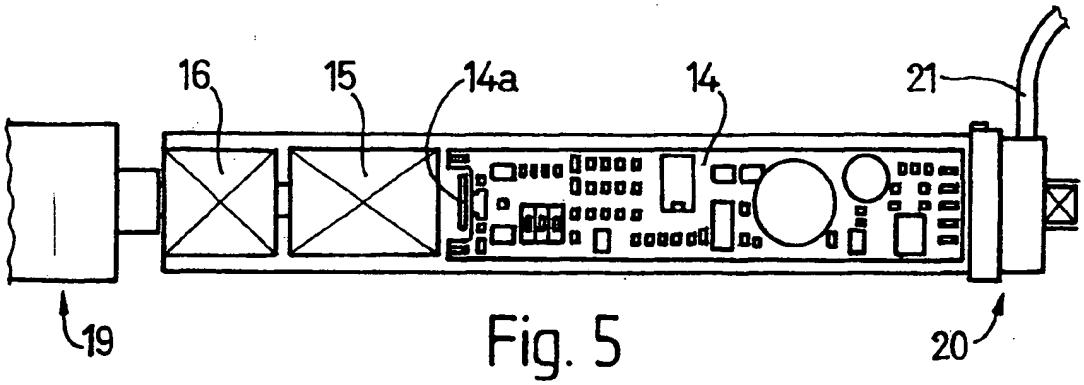

Fig. 5

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Description

This invention is concerned with an electric engine control electronic board.

The applicant is the holder of Spanish Utility Model No. U-9401522, which is concerned with a sun-shield curtain device for vehicles, which comprises an electronic board or strip which electrically, in a regulated manner, activates the engine which rolls and unrolls the sun-shield curtain over a tube between two engine path start and end positions.

This electronic strip or board as described in the said sun-shield device for vehicles enables control of electric engines for different applications, for which there is a disc, displaying colours in black and white, at one of the ends of the engine shaft, in the turning of which an electronic reader picks up the variations of light reflected and these brightness variations are converted into electrical pulses and, thereby, the number of turns of the engine shaft, enabling programming of the stoppage of the engine at one or several points corresponding to respective required positions, expressed in the number of turns, the input and stoppage point codes of which are programmed by pressing opposite direction keys together, and comprising engine and braking load limitation functions.

However, the known electric engine control electronic boards have the drawback that, for them to work, they require an auxiliary circuit or circuit integrated with the electronic memory.

These drawbacks and requirements have been completely eliminated by the electronic board as per this invention since, in order for it to work, it does not need to be equipped with an auxiliary circuit or circuit integrated with its memory, given that, for it to work, the user simply needs to send the engine a signal for it to reach a required point, at a specified time when this activation is required to be repeated periodically, so that the signal given at a specified time is memorized, and this activation can be modified by reprogramming it.

The electronic control board as per this invention enables multiple applications, eliminating the existing problems in the corresponding assemblies known until now.

Thus, as per one application of the electronic control board, to move folded articles such as blinds, awnings and the like, low-powered electro-engines are required to take up small amounts of space, so that they can be fitted into small housings provided in the inner walls of rooms, etc. of buildings, which has the drawback that, if the blind or folded article is large, the electro-engine does not have enough power to pull it up or down.

Similarly, until now, all the existing devices are equipped with the activation controls which have to be pressed by the actual user, from their actual site of installation, which means that the user has to go to where these controls are installed.

These drawbacks have been completely eliminated by the electronic control board with which this invention is concerned, which is equipped with a device with a layout which allows the activating electro-engine to be more powerful and to be operated remotely, by infrared or by radio waves, providing increased convenience for the user.

According to the above, the electronic control board provided in the device to move articles folded in the opposite direction by the rolling/unrolling of extended elements by the action of activators, as per this invention, of the type which comprises an electro-engine which acts as the main activator of the rolling/unrolling to move the articles folded in the opposite direction by the instructions received from a control unit, is characterized essentially by the fact that the electro-engine is coupled to a reducing unit of several stages, which operates with planetary demultiplication; the output of this reducer activates the rolling/unrolling drum of the extended elements, the electro-engine of which is activated by the electronic control board, equipped with components which enable remote programming of this activation.

As per the invention, the different components of the device which incorporates the electronic control board are substantially in a three-dimensional T-shaped layout, and the electro-engine, the reducer and the electronic board are set in the core of the T-shaped layout, so that the drum which takes in the extended elements and the activation shaft coming out of the reducer which drives this drum are set out in the wing of the T-shaped layout. This three-dimensional T-shaped layout consists of a single housing which accommodates the different components and which, at the top in the wing, incorporates the through opening for the extended elements, and at least two elements at the side, for transmitting/receiving remote control instructions enabling the housing to be installed anywhere in the building.

Meanwhile, the electro-engine has an output power of at least 60 W.

Similarly, as per another application of the electronic control board, the direct current engines which are mounted inside the hollow of the shafts to effect the movement and/or rolling of flexible assemblies, such as canopies, awnings, blinds, roller blinds, Venetian blinds, and other moving or rolling materials or elements, are low-voltage, direct current, for example 9V, 12V, 24V, etc., and have the drawback that the corresponding transformer unit or transformer is of a size which prevents it from being incorporated into the hollow of the said drive shaft and, therefore, the transformer must be mounted on the outside of the said shaft, bringing a series of drawbacks and making the corresponding installation considerably more expensive.

These drawbacks have been eliminated by the improved direct current engine control electronic board for the movement and/or rolling of flexible assemblies with which this invention is concerned, which comprises an electronic power unit in the board itself, based on a coil on ferrite, diode, rectifier and condenser; this unit is min-

iaturized and enables the electronic board to be mounted forming an integrated part of the so-called small-diameter tubular engines, which are inserted in the hollow of the drive shaft of the corresponding assembly.

These and other characteristics will be made clearer by the detailed description which follows, to assist which two sheets of sketches are attached, setting out a practical case of production with two applications, cited solely as an example and not limitative of the scope of this invention.

In the sketches:

Figure 1 is a perspective view of the housing which accommodates the device incorporating the electronic control board as per this invention, in the application for moving articles folded in the opposite direction to roll/unroll them.

Figure 2 is an overhead lengthways section of the housing, illustrating the position of the electronic control board as per this invention and the other components of the device.

Figure 3 is an overhead cross-section of the back of the housing in figure 2.

Figure 4 is a diagrammatic plan view of the improved electronic control board as per the invention, which incorporates the electronic power supply or unit in its circuit.

Figure 5 is an overhead diagrammatic view of the assembly of the electronic control board equipped with the miniaturized power supply illustrated in figure 4, integrated in the assembly of a tubular, low-voltage, DC engine mounted in the shaft of a blind or similar, to drive it.

Figure 6 is a sideways overhead diagrammatic view of a shaft driven by a tubular engine which incorporates the electronic control board as per the invention, in an example of application for blinds.

Figure 7 is a frontways overhead diagrammatic view of the example of application for blinds in figure 6, as per this invention.

Figure 8 is a frontways overhead diagrammatic view of the example of application for blinds according to the known technique, which requires external mounting of the transformer, as is illustrated.

According to this invention, the electric engine control electronic board with which this invention is concerned, with the references 8 (in figures 1 to 3) and 14 (in figures 4 to 7), consists of the electronic strip or board described in the said U.M. ES U 9401522, which has been revised and extended, and which incorporates a component which acts as a clock and enables the user to program the activation of the engine with great timing precision.

As per this invention, the electric engine control electronic board consists of an electronic board which comprises the following elements and has the following functions:

- In the engine in question, a partially covered disc, coloured white and black, is attached on one of the ends of the shaft;
- When the engine turns over, the disc turns in front of an electronic reader which picks up the reflected light variations;
- These light variations are filtered and regulated so that they can be transmitted as electrical pulses which can be counted, in other words, the turning of the engine is converted into counted pulses;
- Using the appropriate software entered in the processor, one or several stoppage points of the engine can be programmed, based on the required position expressed in the number of turns;
  When this required stoppage point or position is reached, it can be periodically repeated on an indefinite basis, by activation and storage of a preset number of turns, which can be reprogrammed as many times as the user wishes;
- The input code or code for start of operation is reached, for example, by pressing two opposite direction keys together for more than 10 seconds. To program any required stoppage point, the procedure is the same.
- Similarly, the board incorporates an integrated engine and braking load limitation function by inversion.
- The electronic board as per the invention incorporates the new feature of a component which acts as a clock, which enables the user to program with great timing precision.
- Operation of the electronic board as per the invention means that the user, at the specific time he wants the engine to stop at a point, and this stoppage to repeat periodically (every 24 hours), simply needs to send a signal to the engine, and this signal sent at a specified time is memorized, and acts indefinitely, until it is changed by the same procedure.

As can be seen, the electronic strip or board as per this invention does not require there to be an auxiliary circuit or one integrated with its corresponding electronic memory, as is required by the known boards on the market.

The board with which the invention is concerned permits ease and precision of activation on the electric engine, programming with great timing precision, and easy handling for the user.

In the application illustrated in figures 1 to 3, showing a device incorporates the electronic control board 8 as per this invention, which enables articles folded in the opposite direction to be moved by rolling/unrolling of elements extended by the action of activators, with which this invention is concerned, with the general reference 1, comprises an electro-engine 2 which is coupled to a reducing unit of several stages 3, by a flexible belt 4 or other similar element, and this reducer 3 works with a planetary demultiplier 3a.

Shaft 5 coming out of the reducer 3 drives the drum

or reel 6 for rolling/unrolling the extended elements 7, which, when they are rolled/unrolled, move the folded articles in question in the opposite direction.

The electro-engine 2 is driven by an electronic board 8, fitted with a series of components which enable remote programming of this activation.

As per the invention, as is illustrated, the different components of device 1 of the application take on a three-dimensional, substantially T-shaped layout, set out in a housing C which has this T shape; in this layout the electro-engine 2, the reducer 3 and the electronic board are set out on the same plane and take up the core C_1 of the T-shaped layout of the housing C; meanwhile the drum 6 which takes in the extended elements 7 and the drive shaft 5 coming out of the reducer 3 and which drives this drum are set out in the wing C_2 of the T-shaped layout.

The housing C comprises, in the wing C_2, primary inner guide means 9, and secondary guide means 10, fitted in a through opening 11 at the top of the wing; these guide means consist of a pair of separate rods, between which the extended element 7 moves in its rolling or unrolling in respect of the drum or reel 6. Similarly, the top of the housing, on both side edges of the wing, has two side remote control instruction transmitter/receiver elements 12, 13, enabling the housing C to be placed in any position to the right or left of a building.

As per the invention, the electro-engine 2 has an output power of at least 60 W.

The device of the application, as per the invention, has many further applications, to name a few: enabling raising and lowering of folded articles, such as blinds, awnings and the like, of buildings, on a regulated basis in terms of timing, scheduling, number of times, wholly or partially; this regulation is effected via the electronic board 8 of the device. The extended element 7, in this case, is the classic tape positioned next to the window inside the building in question. The fact that it has two transmitter/receiver elements 12, 13 on the front edges makes it possible to mount device 1 at the front, to the right or the left of the window, door or opening in question of the building. The remote control may be by infrared, radio waves, or any other, offering great convenience to the user.

This device allows the electro-engine to be high-powered, at least 60 W.

The discs of drum 6 can be separated as required, so that the extended element 7 is the required width, and it can pick up elements of different widths. These extended elements 7 may be the classic tapes as mentioned, chains, cords, bobble cords, cables or other pulling devices.

Similarly, the flexible pulleys 4 may be serrated belts or any other equivalent type.

With regard to the application illustrated in figures 4 to 7, figure 4 shows the improved electronic control board 14 as per the invention, which incorporates a miniaturized electronic power unit or supply, which controls direct-current, low-voltage engines for moving and/or rolling flexible assemblies; this electronic power unit or supply provides stabilized direct-current, low-voltage power, such as 9V, 12V, 24V, etc., to the tubular engines which are used to move canopies, awnings, blinds, roller blinds, Venetian blinds and other moving or roller materials, such as roller or moving curtains.

This electronic power unit or supply comprises the main components, represented in diagram form, of a coil on ferrite, a diode, a rectifier and a condenser, although it may naturally comprise more than one of these components.

Figure 5 illustrates the improved electronic board 14, provided in the actual circuit with a miniaturized electronic power unit or supply, enabling it to be integrated in the assembly of a tubular, direct-current, low-voltage engine 15, and the corresponding reducer 16. The diameter of the tubular engine 15 is very small (in the region of 22 mm.). This assembly is fitted in the hollow of shaft 17, on which the blind 18 is rolled up.

As is shown in detail in said figure 5, the assembly of control board 14 with a turn and electrical positioning pulse coding disc 14a, tubular engine 15 and reducer 16, is mounted on the shaft of the blind, and, at one end, the connection 19 is provided between the shaft of the reducer 16 and the shaft of the blind 18, and, at the other end, the bracket 20 to the wall of the tubular engine/board assembly. 21 illustrates the electrical connection wires.

As is shown in figures 6 and, particularly, 7, activation of the electronic control board 14 of the tubular engine 15 for rolling/unrolling of the blind 18 in time, in accordance with the program of the electronic board 14, can be effected by the user by pressing a button 22, which is preferably double or single, provided on the wall, or the electronic board 14 can be controlled remotely by infrared or equivalent.

Figure 8 shows the current layout, which means that the transformer 23 has to be positioned outside, in a hole made in the wall of the building, far away from the tubular engine 24 fitted in the corresponding shaft of the blind 25, which is activated by a double or single button 26. The exterior position of the transformer 23 means that additional masonry work has to be done, involving extra costs in the installation, and greater complexity of this.

Claims

1. Electric engine control electronic board, of the kind that comprises an electronic turn reader of the engine shaft, via transformation of the engine's turns into electrical pulses which can be counted, an engine stoppage programmer in at least one point, based on the required position expressed in the number of turns, enabling engine stoppages repetitively and periodically by activation and storage of a preset number of turns, which can be pro-

grammed, an input code or code for start of operation and of the programming of the engine stoppages at the required points, and an engine and braking load limitation function, characterized by the fact that it incorporates a component which acts as a clock, enabling the engine operation to be programmed with the stoppages at the required points with great timing precision, so that the user simply needs to send a signal to the engine at a specified time when the engine reaches a stoppage point required to be programmed so that it will repeat periodically; this signal is memorized at the specified time, and the time and stoppage point programmed can be changed.

2. Electric engine control electronic board, as per claim 1, characterized by the fact that the periodic repetition is every 24 hours.

3. Electric engine control electronic board, applicable to devices for moving articles folded in the opposite direction, by the rolling/unrolling of extended elements by the action of activators, of the kind which comprises an electro-engine which acts as the main activator of the rolling/unrolling to move the articles folded in the opposite direction by the instructions received from a control unit, as per claim 1, characterized by the fact that the electro-engine is coupled to a reducing unit of several stages, which operates with planetary demultiplication, the output of which from the reducer drives the rolling/unrolling drum of the extended elements, the electro-engine of which is activated by an electronic board equipped with components enabling remote programming of this activation.

4. Electric engine control electronic board, as per claim 3, characterized by the fact that the different components of the device are substantially in a three-dimensional T-shaped layout, and the electro-engine, the reducer and the electronic board are set in the core of the T-shaped layout, so that the drum which takes in the extended elements and the activation shaft coming out of the reducer which drives this drum are set out in the wing of the T-shaped layout.

5. Electric engine control electronic board, as per claim 4, characterized by the fact that this three-dimensional T-shaped layout consists of a single housing which accommodates the different components and which, at the top in the wing, incorporates the through opening for the extended elements, and at least two elements at the side, for transmitting/receiving remote control instructions enabling the housing to be installed anywhere in the building.

6. Electric engine control electronic board, as per claims 3 to 5, characterized by the fact that the electro-engine has an output power of at least 60 W.

7. Electronic control board for direct-current electric engines, for moving and/or rolling flexible assemblies, as per claim 1, characterized by the fact that it comprises a miniaturized, stabilized electronic power unit, comprising the main components of at least one coil on ferrite, at least one diode, at least one rectifier and at least one condenser, the layout of which enables it to form an integrated part of the so-called small-diameter tubular engine, attachable inside the hollow of the drive shaft of the corresponding assembly.

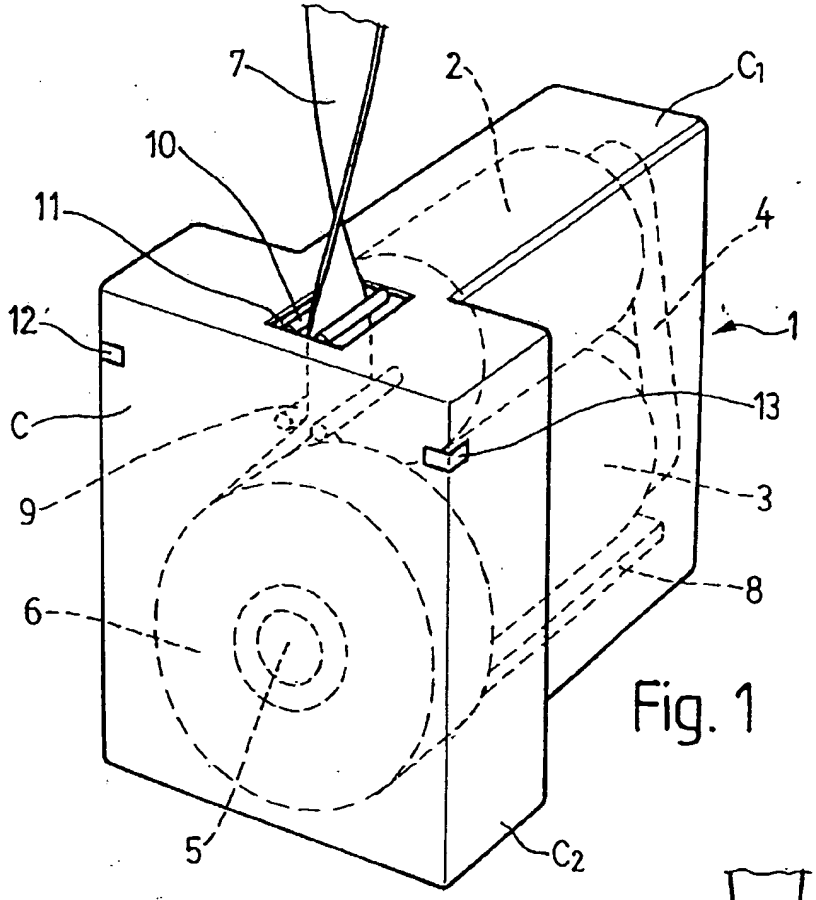

Fig. 1

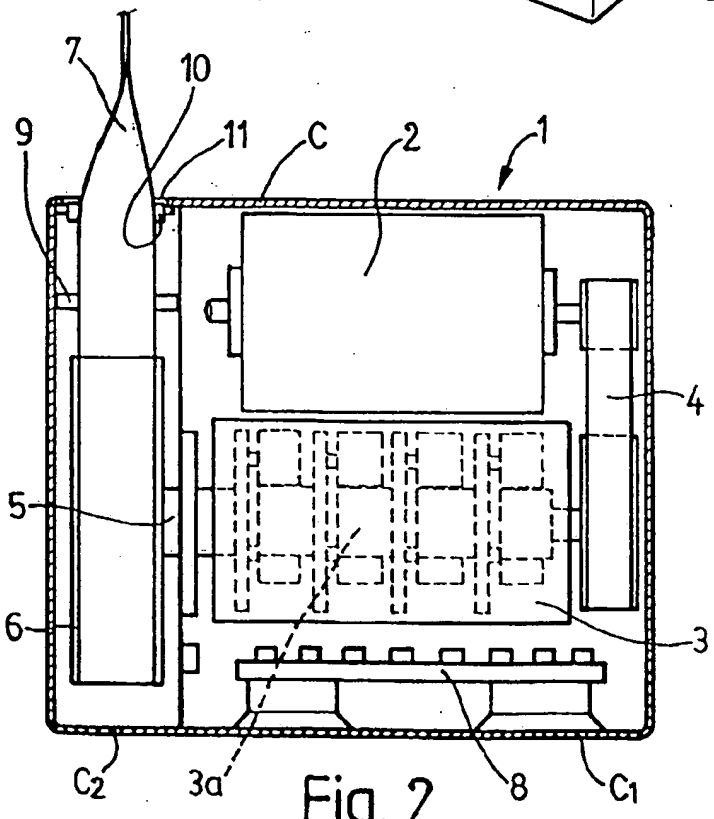

Fig. 2

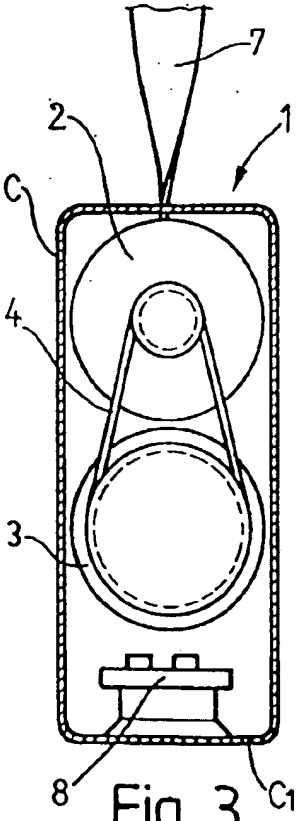

Fig. 3

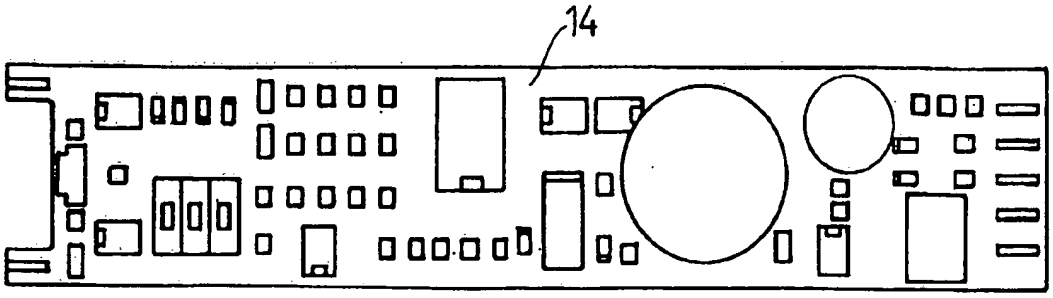

Fig. 4

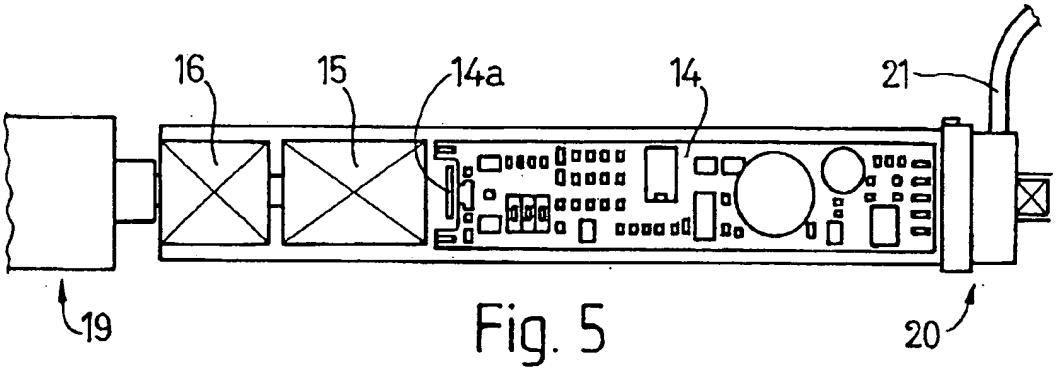

Fig. 5

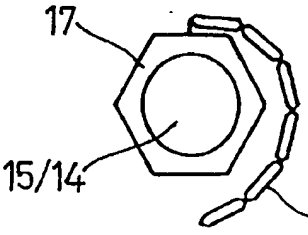

Fig. 6

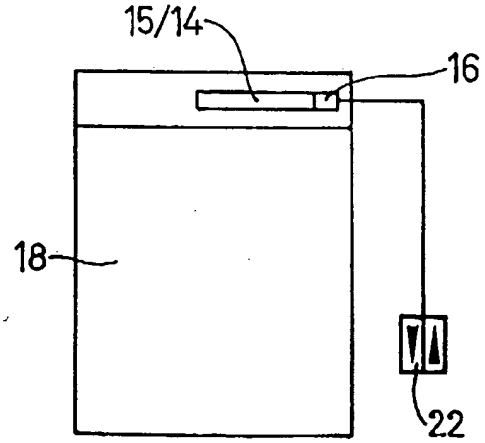

Fig. 7

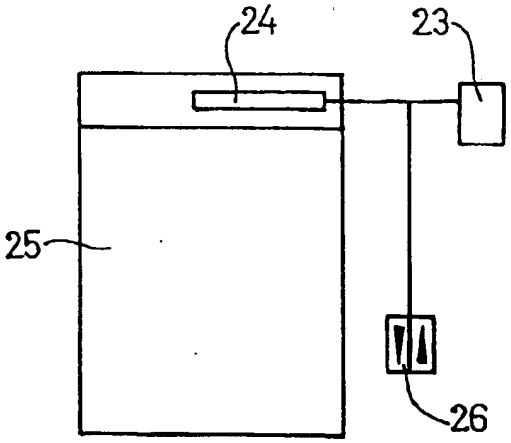

Fig. 8